

Welcome



Certification and Accreditation of Space Systems

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2 March 2011

Agenda

- *Requirement to Certify and Accredite*
- *What's the Requirement*
- *To Whom Does it Apply*
- *Who's Responsible*
- *When Does it Apply*
- *Why Accredite a Space Vehicle*
- *How to C&A a Space Vehicle*
- *SV C&A Challenges*
- *Summary*



Requirement to Certify and Accredit

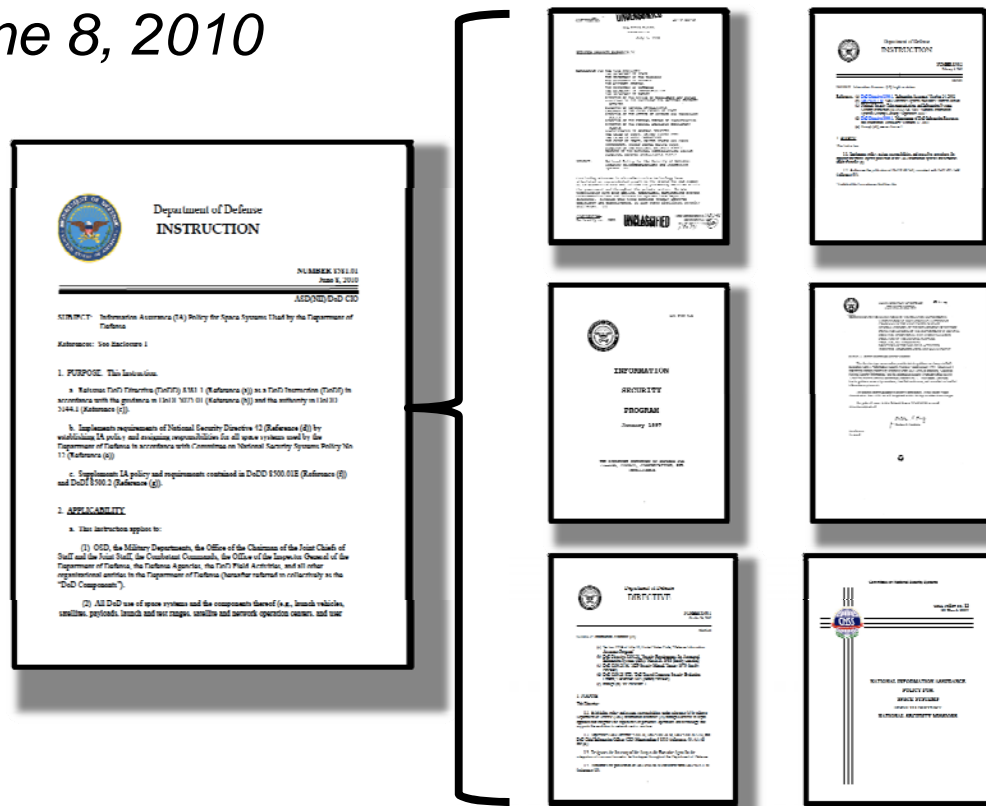
Where'd that come from?

- DODD 8581.1, "Information Assurance (IA) Policy for Space Systems Used by the Department of Defense," June 21, 2005

– *Re-issued as DODI, June 8, 2010*

– *Invokes:*

- NSD 42 – 1991
- DOD 5200.1-R – 1997
- DODD 8500.01E – 2002
- DODI 8500.2 -- 2003
- USDI DTM 04010 – 2004
- CNSSP No. 12 – 2007



What's the Requirement

What do we have to do?

- “All DoD-owned or controlled space systems shall comply with References... and shall meet the IA requirements described in the procedures section... regardless of mission assurance category (MAC) or confidentiality level (CL).” (DoDI 8581.01, June 8, 2010, pp 1-2, para 2.)
- “Ensure that ... contracts, or formal agreements... executed by DoD Components to acquire space systems... from commercial, other USG, or foreign government-owned entities require compliance with this Instruction ...” (DoDI8581.01, June 8, 2010, p. 8, para 7b)
- “Program managers for space systems... include ISSE, crypto certification, and certification and accreditation in their program plans, budgets, and contracts” (DoDI8581.01, June 8, 2010, p. 8, para 7d)



To Whom Does it Apply

Is my system special?

- “All DoD use of space systems and the components thereof (e.g., launch vehicles, satellites, payloads, launch and test ranges, satellite and network operations centers, and user equipment) to receive, process, store, display, or transmit classified or unclassified DoD information...” (DODI 8581.01, June 8, 2010, pp 1-2, para 2.)
- “Is my space system special?”
 - *Short answer, if you are using DoD funds, or performing a DoD mission; no.*
- “Where do I get a waiver?”
 - *DoDI 8581.01 has no provision for a waiver process*
 - *C&A is a risk-based process – DAA can choose to accept or not accept risk once risk is identified and evaluated through certification*



When Does it Apply

Only on orbit or throughout life?

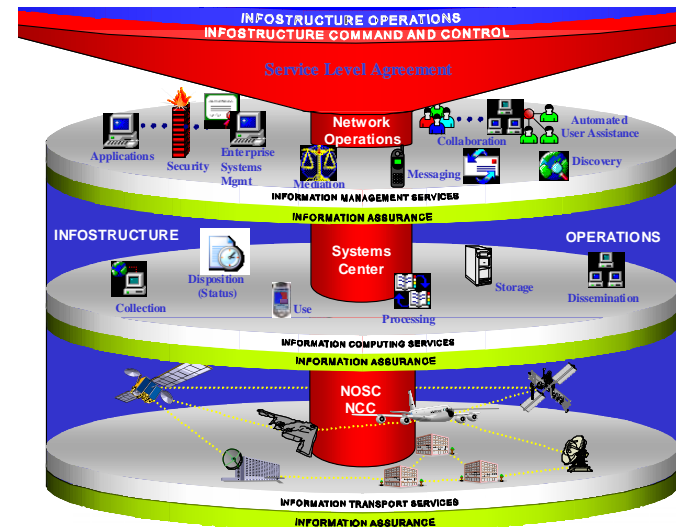
- DoDI 8581.01 addresses the entire system life cycle
 - “*First-blush*” – *cradle* – *grave*
- DoDI 8581.01 does not apply to:
“... space systems or segments thereof that were past the point of program initiation on June 21, 2005. However, this exemption does not extend to any subsequent major redesigns of these systems or segments.” (DODI 8581.01, June 8, 2010, p. 2, para. 2.b.(2))
- **BOTTOM LINE:** Requirement applicable to nearly all space systems currently in acquisition process. Continues through life cycle.



Why Accredit a Space Vehicle

What problem are we trying to address?

- Most people agree that accrediting space ground systems makes sense
 - *Highly complex, IT systems, with significant network connectivity*
 - *Perceived threat to ground systems based on media representation of generalized cyber threat*
- Since 2005 significant progress to understand, certify, and accredit ground components
- To date, little done to C&A space vehicles



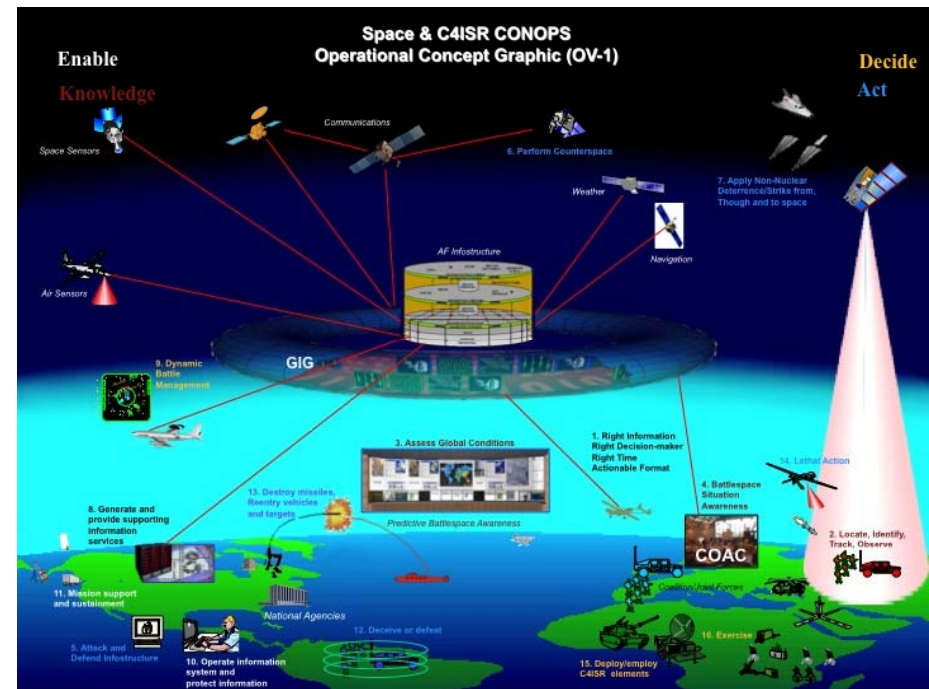
Source: AFSPC Infostructure Architecture OV-1 drawing, May 2004
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Why Accredit a Space Vehicle

What problem are we trying to address?

- Myth:
 - Protection through isolation
 - Simple systems with limited processing capabilities/code
 - Too complex for ordinary people to understand
- Reality:
 - Complex extensions of other networks
 - Complex computing environments
 - multiple processors
 - multiple classification levels
 - Complex software environments w/ability to modify on orbit



Source: AFSPC Space & C4ISR CONOPS
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- 1st – 5th generation languages
- Typical satellite 100K – 1 Million lines of code



Who's Responsible

Who owns the problem?

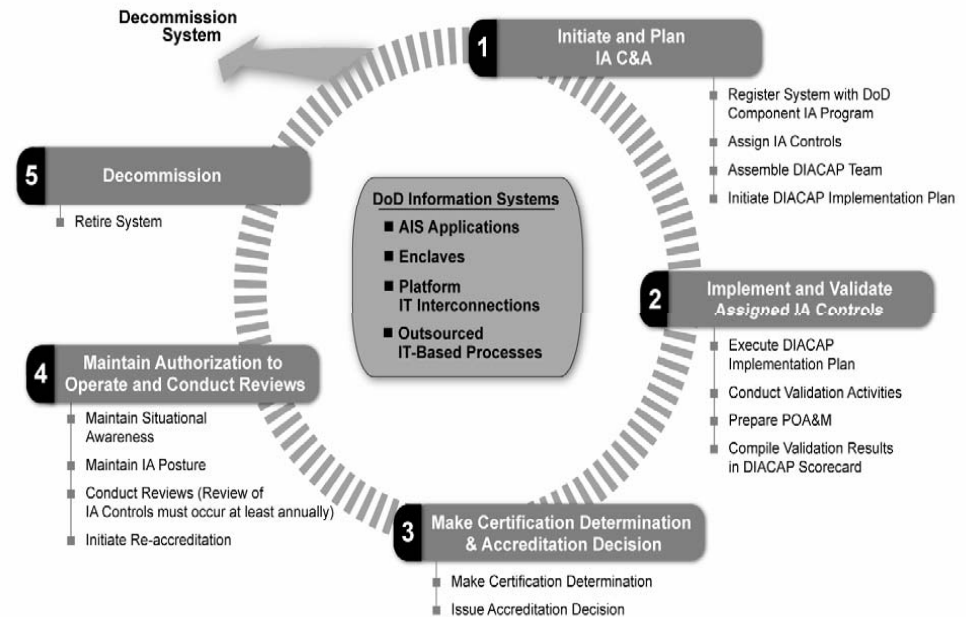
- ASD(NII)DoD CIO – Signed out DoDI 8581.01
 - *Oversees and monitors all IA activities related to space systems in DoD*
- USD(AT&L) when serving as milestone decision authority (MDA)
 - *Conducts independent evals of performance and resource requirements*
- USD(I) collects/processes supporting intelligence info
- Director NSA
 - *Plan/budget/develop programs to protect space systems*
 - *Evaluates and certify cryptography*
 - *Performs end-to-end system security evaluations when requested by NII, EA for Space, USD(AT&L) or CDRUSSTRATCOM*
- Heads DoD Components
 - *Ensure solicitations/contracts/agreements include requirements*
 - *Ensure program managers include C&A in budgets*
 - *Ensure requirements validation*
- CDRUSSTRATCOM assign MAC, CL, and DAAs



How to C&A Space Vehicle

If no one's done it before, how do we proceed?

- Change perspective from SV to Information System (IS)
- Per DODI 8581.01 follow either DIACAP or DCID guidance
- Tailor IA controls and seek early agreement on DIACAP Implementation Plan (DIP)
- Ensure signed DIP not later than Preliminary Design Review (PDR)
- Ensure integration w/SV design team



Source: DODI 8510.01, Nov 2007, p.13.
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SV C&A Challenges

What to be prepared for?

- Culture shock – for both IA and SV professionals
 - *Language and technology barriers – look for the commonalities*
 - *Resistance to change – cyber warfare requires a new mindset*
- Testing – how do you do it and who's qualified?
 - *Clearly identify validation/verification/test procedures in requirements trace tools*
 - *Consider how existing test regime can support IA test objectives*
 - *Identify SV production flow points that permit IA functionality testing*
 - *Involve DAA in identification of unique test requirements*
 - *Identify independent testers early – consider national labs*
 - Unique mix of IA and SV skills required for some, but not all testing



SV C&A Challenges

What to be prepared for?

- No space qualified, common criteria assessed IA components
 - *Issue understood by DAAs – focus on objective of common criteria*
- No space qualified Cross-Domain Solutions available
 - *Each instance unique*
 - *Who tests and certifies capability – negotiate w/DAA*
- Multiple SV environments
 - *Ground – factory, shipment, satellite prep, pre-launch*
 - *Space -- early-orbit, nominal operations, anomaly conditions, disposal*
- Who functions as Computer Emergency Response Team?



Summary

Not new but still novel...

- Requirement has existed since 2005
- Both SVs and ground systems subject to C&A
- New paradigm, but not a new process
 - *DIACAP process flexible enough to support SV C&A*
- Challenges are manageable if addressed early
- C&A is about understanding and managing the risks of operating critical national resources
 - *SVs as a critical part of the space system must be included in the process*

“The “core of space warfare” is the struggle for information dominance.” (Source: Institute of Air Force Command, Beijing, China, 2009)





Thank you